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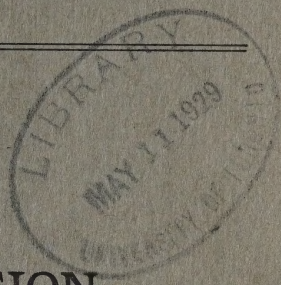
Canada Mines Bureau of Explosives
Division

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CANADA
DEPARTMENT OF MINES
HON. CHARLES STEWART, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

EXPLOSIVES DIVISION

LT.-COL. G. OGILVIE, CHIEF INSPECTOR



ANNUAL REPORT

OF THE

EXPLOSIVES DIVISION

OF THE

DEPARTMENT OF MINES

FOR THE CALENDAR YEAR

1928



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
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ANNUAL REPORT
OF THE
EXPLOSIVES DIVISION OF THE DEPARTMENT OF MINES
FOR THE CALENDAR YEAR 1928

BY

Lt.-Col. G. Ogilvie, C.M.G.

The following report deals with the administration of the Explosives Act during the year ending December 31, 1928.

MANUFACTURE OF EXPLOSIVES

The licensed factories in operation remained as at the close of 1927, except that a factory was established by the Mexco Company at Parry Sound, and licence issued in anticipation of its operation. That company's factory at Swastika was not operated, or licensed, in 1928. The factory at James Island, B.C., previously shown as owned by the Canadian Giant Ltd., is now entered in Appendix A as one of the factories owned by the Canadian Explosives Ltd., that company having absorbed the Canadian Giant Ltd.

Inspectors of the Division made 32 visits of inspection to factories, and 7 additional visits were made to fireworks factories by deputy inspectors of the Royal Canadian Mounted Police. The conditions found were satisfactory. No irregularity, other than of a minor character, promptly rectified, came to notice. In the larger factories the system in vogue, during the last few years, of keeping records of time lost through accidents, and the healthy rivalry induced between factories, or sections of factories, in aspiring towards freedom from accidents, has unquestionably gone far in inculcating employees with an appreciation of the possible causes of accidents, and in developing that care in work which is instinctive, and in no way delays operation. Animated by this spirit, operatives regard rules and regulations not as bugbears, but as the sign posts they truly are on the road to safety.

The production of explosives continues to increase. High explosives and black powders (Appendix B, Classes I to IV) manufactured during the year amounted to nearly 23,000 tons, an increase of 3,000 tons or 15 per cent above the production of 1927.

ACCIDENTS IN FACTORIES

Only one of the accidents which took place in explosives factories during the year had serious consequences, one employee being killed. Each of the two others caused injuries of a minor character to an employee, involving only short absence from duty.

The fatal accident occurred at Belœil on Saturday, January 23, while a catch box for wash water from a nitroglycerine neutralizing house was being cleaned out. The operator was instantly killed by the explosion.

The wash waters are led from the neutralizing house, by a gutter about 90 feet in length, to the catch box which is in a light frame building. In the procedure followed most of the nitroglycerine contained in the wash waters is received from a settling tank within the neutralizing house, and the outside catch box acts as the final trap for the collection of nitroglycerine and other impurities carried over in the waters from the settling tank. These settle to the bottom of the catch box, and the overflow from the catch box passes to an open ditch. Any liquid nitroglycerine may be drawn off, but the sediment, or "mud", containing nitroglycerine, is absorbed with sawdust and removed in a bag for destruction. On this occasion a filled bag had been placed well clear of the catch box, and the man had returned, presumably to complete the cleaning operation. The bag was recovered intact after the explosion, and on analysis was found to contain all the nitroglycerine which, from previous experience, was to be expected, considering the charges run since the last weekly cleaning—only two charges had been run through this particular neutralizing house.

A crater about 5 feet in depth and 15 to 20 feet across was formed by the explosion, indicating a violence of explosion which could not be attributed to any conceivable small residue of nitroglycerine in the tank. It could only be accounted for by the detonation of an accumulation of nitroglycerine in the open ditch in the immediate vicinity of the catch box. The explosion had undoubtedly been initiated by some action of the operator in the last stages of cleaning. The ground was slippery and he may, stumbling, have violently struck some frozen nitroglycerine with his aluminium scoop—but this is not a necessary assumption. The temperature was below zero and he no doubt acted with every possible care in dealing with the frozen crystals of nitroglycerine which would be apparent. Yet, the presence of sawdust in contact with the nitroglycerine "mud", at this temperature, would most probably bring about a speedy and extensive crystallization not immediately noticeable, and so increase the sensitiveness of the whole that but a very slight shock would suffice to cause detonation.

The flushing of gutters and catch boxes with warm water, prior to cleaning, was resorted to in cold weather, as an immediate precaution, and endeavours to overcome the difficulty in the extension of a labyrinth system, due to the flat terrain, have been attended by very promising results.

An explosion of .22 R.F. shells, primed, occurred at the Dominion Cartridge Company's factory at Brownsburg, P.Q., on February 20, when the shells were being shaken on to a loading plate. The operator had his

hands slightly scorched and his eyes were temporarily inflamed. His eyelashes and eyebrows were not burned, nor was the skin broken on hands or face. Although the liability to *en masse* explosion is being reduced due to the developments in the manufacturing processes, and composition used, it is gratifying to note that, since the more serious accident of the same nature reported last year, the reduction in quantities handled on the bench, and the introduction of screens for holding the shells while preventing any accumulation of explosive dust with them, have proved efficacious in protecting the operator.

A small laboratory in the factory of the Canadian Explosives Limited at Belœil, P.Q., was destroyed by fire on September 13. It was caused by a rapid reaction consequent on the mixing of sodium peroxide and D.N.T. in the course of experimental work. Fire followed and spread with great rapidity. The chemist conducting the experiment was struck by flying particles and burned slightly about the face and hands. The others in the laboratory escaped unhurt.

In addition to the above there are to be recorded three fires or explosions, not involving injury to personnel, but the circumstances of which present features of interest apart from the resulting damage to property.

The contents of a glaze mill, at the factory of the Canadian Explosives Limited at Belœil, exploded when the building was struck by lightning on May 22. No one was in or near the building, and the power had been shut off when the storm developed. No one sustained injuries other than of minor character. An employee, in a redistilling house 450 yards distant, was slightly burned with acid from a broken glass tube; another, in a building 350 yards distant, was slightly cut by broken glass, and a similar report was made by a person in a house outside the factory and 800 yards distant. Interest attaches to the observation of the effect of the explosion, as shown by the material damage done, and having regard to the quantity of explosives involved and the efficacy of the protective barricades.

There were in the building approximately 4,200 pounds of sporting powder, of which 3,000 pounds were in the two glaze barrels and 1,200 pounds in a powder truck in the elevator annex, also about 4,500 pounds of fuse powder in 50-pound canisters, on the floor above the glaze barrels. The building was barricaded on three sides opposite to each of which was another danger building, itself barricaded, at a distance of 400 feet. There were no buildings on the east side which was not barricaded.

The barricades (Rapauno type) were practically razed to the ground. On the open side, and in a sector radiating apparently from that part of one other side where there was an entrance through the barricade, heavy debris was projected up to about 300 feet, and medium debris, as fragments of timbers and pieces of corrugated iron to twice that distance. In the other directions such debris was found only in the immediate vicinity of the building and light debris ranged to 300 feet. No building was struck by debris, but in the three nearest buildings, already referred to, some rafters were broken, and parts of corrugated iron wall coverings torn loose by the explosion.

The damage to more distant buildings was limited to instances of broken glass, loosened window frames, and the like.

In the factory at James Island, B.C., on June 13, the outlet plug of a car conveying molten nitre cake jarred loose when the car was passing over a switch in front of a soda dry house. The contents discharged. The molten nitre cake came in contact with the wooden floor of the soda dry house, and fire broke out. The building was damaged, but was again in operation the day following the fire. No one was injured.

At the same factory on December 17 a charge of 500 pounds of black powder exploded in a wheel mill on the mill being started. No one was injured, and the machinery was undamaged. Most of the light building was blown out. The greater part of the debris lay within 50 feet, and all within 100 feet. No evidence was found pointing to the presence of foreign material in the charge, but it is considered possible that friction set up by a sliding action of the wheel on starting, not infrequently observed, may have been at least a contributory cause of the ignition.

MAGAZINES

The number of new magazines for which licences were issued slightly exceeded the number discontinued, bringing the total of permanent magazines to 283, a net increase of 11. The temporary magazine licences issued, 208, showed an increase of 11.

While, as a result of inspections made, improvements where necessary were effected in buildings or in their maintenance, the irregularities noted were such as were adequately dealt with without having recourse to prosecution, except in two cases when magazines had been used to store explosives considerably in excess of the amount allowed by the licences. The owners were convicted and fined.

No accident occurred in any licensed magazine, but there were a few instances of magazines having been broken into and explosives stolen. From one strongly built magazine 21 cases of dynamite were taken. Seven other magazines were broken into but the quantities taken were relatively small, and totalled 500 pounds and 200 detonators. It is of interest, in this connexion, to note that of these seven magazines three were of brick or concrete with steel doors, and three were of other substantial construction. One was of light construction, but the depredations on the contents of the most strongly built magazines—and these are by no means the first instances of the kind—show that reliance cannot be wholly placed on strength of construction as a protection against unlawful entry. Magazines are invariably, and necessarily, placed in isolated locations, and even when frequently used or visited by the owners opportunity for forcing an entry cannot be lacking. The benefit gained by the building of a magazine of brick or concrete becomes no doubt apparent in cost of upkeep when it is kept in permanent operation. Properly designed light buildings on the other hand will serve to keep the explosives in equally good condition, and will be productive of less debris in the unfortunate event of an explosion.

By the courtesy of the Chief Inspector of Mines for Manitoba, particulars were received of an explosion in a thaw house. The building was of log construction, 15 feet by 20 feet, and banked in part by a small sandy hill. Its exposed side faced a lake. It contained 29 cases, about

1,450 pounds, of 40 per cent Forcite. The explosion occurred at 5.10 a.m. on November 14. No person had entered the magazine since 3.30 a.m., when some explosives had been taken out for use. The building was steam heated and the investigation pointed to the explosion having been due most probably to initiation of decomposition by over heating. No one was injured. The thaw house was completely destroyed. Most of the debris was projected on to the frozen lake and extended to a distance of 1,400 feet. A little debris was also found 820 feet distant on the partly protected landward side. Practically all windows in mine buildings 500 feet distant were broken, while in a cookhouse, 1,200 feet away, only two panes of glass were broken.

Inspectors of the Division made 307 visits of inspection to magazines and, in addition, 122 were made by deputy inspectors of the Royal Canadian Mounted Police.

The Commissioner of the British Columbia Provincial Police also gave valued assistance by arranging for the inspection of certain magazines, which to accomplish otherwise would have entailed much expense. The reports on these showed the regulations were being observed and the magazines well maintained.

EXPLOSIVES FOUND

Usually the explosives found abandoned comprise small quantities which have been overlooked at the completion of some operations, or which have been stowed in some out-building with a view to future use and have been forgotten. Occasionally considerable quantities have been left on mining property. This latter evil is being checked by the co-operative action of the mine inspectors of the several provinces before a mine, on cessation of operation, passes from their inspection and control. This year an instance of the abandonment of a considerable quantity of explosives, in somewhat different circumstances, was traced by the Royal Canadian Mounted Police, when ten cases of dynamite were found abandoned in the bush. These had been evidently in transit to a mining property, and, either by reason of difficulty in further progress, or the need for them having passed, had been left. When found, the mine was no longer in operation. The Royal Canadian Mounted Police were requested to destroy the explosives, and successfully carried out this operation, so removing a menace to the public safety.

Members of that force also located and destroyed small quantities to which brief reference may be made.

About 17 pounds of dynamite, made up in the form of bombs with detonators attached, were found cached in a barn. One hundred and ninety detonators and 3 pounds of dynamite were found near a race track. Thirty-three pounds of dynamite, in bad condition, came to light near to where road construction had been carried out some years previously. Two pounds of dynamite and 5 electric blasting caps, found by children in an empty house, were taken from them, and 24 detonators also found by children on the site of recently concluded operations, were handed over by them to the police.

EXPLOSIVES CONDEMNED ON INSPECTION

No large stocks of explosives were found in an unserviceable condition, but 2,500 pounds of dynamite, 50 pounds of black blasting powder, and 3,000 detonators, distributed in 19 magazines, were so found and destroyed.

UNLICENSED PREMISES

Inspectors of the Division made 700 inspections of unlicensed premises, and deputy inspectors of the Royal Canadian Mounted Police 2,500. The opportunities which these deputy inspectors have of making visits of inspection throughout Eastern Canada have been normally less frequent than in the West, but so far was this difficulty overcome, and so much excellent work had been accomplished last year in Quebec and the Maritime Provinces by the use of a car lent by the Division, and the hiring of another for special patrols, that this year a like facility was provided in northern Ontario. This, supplementing as it does the inspections by the Royal Canadian Mounted Police wherever and whenever these can be made in conjunction with other duties, has extended knowledge and observance of the regulations throughout Eastern Canada to a degree comparable to that which has been attained in the West.

IMPORTATIONS

The Division issued 692 permits and 38 special permits giving authority for the importation of explosives. The explosives, of each class, so imported are given in Appendix C.

With the exception of Cordeau-Bickford fuse, which is not made in Canada, there is but little explosive imported for ordinary use. A large quantity of nitro-cellulose was imported for use in the manufacture of lacquers, some for use in explosive factories, and the propellant powders and fulminate of mercury were to meet the requirements of the manufacture of small arm ammunition and detonators.

The importation of fireworks is on a considerable scale. The rejections at points of entry in Eastern Canada have been few and insignificant. The importations there made comprise fireworks, manufactured in the United States or European countries, of varieties which have been authorized in Canada; also Chinese fireworks supplied through dealers in the United States. These latter have continued the practice, helpful to all concerned, of examining their Chinese consignments, and either testing them themselves, or sending samples to Ottawa for test without prejudice to examination on receipt, before forwarding supplies to Canadian dealers. The examination of direct shipments to Canada has been conducted at Vancouver with the assistance of the Royal Canadian Mounted Police, and the valued co-operation of the chemists of the Dominion Department of Health there. The rejections amounted to approximately 10 tons or 19 per cent of the quantity presented for importation. Practically all of these rejections were from consignments arriving in the first five months. The shipments made during the remainder of the year were of approximately equal volume.

AUTHORIZATION OF EXPLOSIVES

Samples of five explosives were submitted for examination; four were rejected and one authorized. Several minor changes in explosives, already authorized, were also approved after examination. Two brands of safety fuse were submitted and authorized.

Thirty-four new varieties of manufactured fireworks were examined, 25 of which were authorized.

A total of 224 samples of fireworks were examined with a view to importation; of these 90 were authorized.

PROSECUTIONS

Proceedings were taken in twelve cases for violation of the regulations. In one the charge of keeping explosives otherwise than in the manner prescribed for such keeping in unlicensed premises was dismissed. This case is the subject of appeal. Convictions were obtained in the others and fines imposed, the offences being:—

Exceeding the quantity of explosives permitted to be kept elsewhere than in licensed factories or magazines.....	3
Keeping explosives otherwise than in the manner prescribed for such keeping in unlicensed premises, not being in locked receptacles.....	4
Keeping explosives in a licensed magazine in excess of the quantity prescribed by the license.....	2
Conveying detonators and dynamite together.....	1
Leaving a vehicle containing explosives unattended in public thoroughfare....	1

ACCIDENTS

A summary of the accidents with explosives which occurred during the year is given in Appendix D. Reference has already been made to accidents in manufacture. There was none in keeping or conveyance, the attendant circumstances of which would also come under the control of the Explosives Act.

The accidents in use show an increase over previous years. It is quite possible that the records which were obtained during the earlier years, when endeavours first were made to obtain data of accidents, were not complete, but from 1923 onwards, with the information gathered from a careful scrutiny of daily journals, and by the courtesy of the Labour Department, the Provincial Departments of Mines, Workmen's Compensation boards, the Royal Canadian Mounted Police, and others, it is felt that few can have escaped notice. There is, and must always be, a probability of some accidents to private users of explosives, not causing death or serious injury, being omitted from all records and the press.

Examination of the fatalities, under the headings of "Mines and Quarries", "Elsewhere" and "Various", offers a fair basis of comparison, and may with advantage be tabulated. The figures given under the heading "Various" refer mainly to fatalities arising from playing with explosives.

Fatalities with Explosives

Year	In use		Various	Total
	Mines and quarries	Elsewhere		
1923.....	11	29	6	46
1924.....	15	17	7	39
1925.....	19	23	12	54
1926.....	17	26	4	47
1927.....	12	25	7	44
Average 5 years.....	14.8	24	7.2	48
1928.....	26	31	7	64

The consumption of explosives is practically the same as the production which has increased steadily during the years under review, and for 1928 was 35 per cent greater than the average of the preceding five years. The fatalities for 1928 are in the same proportion but are still high in comparison with those for 1927, and, viewed generally, the fact that the frequency of fatalities in the use of explosives shows no sign of decrease is a distinctly unsatisfactory feature.

The figures for mines and quarries show a greater percentage increase, but it may be recalled that this is coincident with notable developments in the mining industry.

Another factor to be considered is that a greater quantity of explosives is used in mines and quarries than elsewhere. A fairly close estimate has been made of the distribution of explosives during the year and, comparing this with the fatalities in use, it is found that one life has been lost in mines and quarries for each one and one-quarter million pounds of explosives used, and, elsewhere, one for each three-quarter million pounds.

Attention has been directed repeatedly to the frequency of accidents arising from playing with explosives, and in particular to those with detonators. As a rule the detonator accidents have been the most common and there always is a depressing sameness in the way in which they are brought about, as reference to the brief accounts given in Appendix D will show. There is no diminution as yet in this class of accident, but it may be hoped that the result of cautions given in schools during the year may show later.

Accidents with other explosives in the present record assume unusual prominence. Gunpowder, or rather the more common black blasting powder, still holds its appeal to boys. The cases which occurred and are illustrative of the consequences to be apprehended when canisters of powder are so left or mislaid as likely to fall into the hands of adventurous youth, may be cited.

Three boys obtained possession of a canister of powder near a mine. They proceeded to pour out small quantities of powder and then to set fire to the heaps formed, until, becoming careless no doubt, the flame from a heap communicated to the remaining contents of the canister, and all three were badly injured—chiefly by burns.

A few boys, who had discovered a mine prospector's abandoned magazine containing several canisters of powder, kept the secret of their discovery, and, apparently, had made a practice of removing and igniting some of the powder. On one occasion one boy opened a canister in the building, and, whether his intention was to set fire to the powder in the canister or only to what had been poured out of it, he ignited the whole. This boy died of his injuries, one of his two companions was severely burned and the other slightly. It transpired later that the boys had previously removed five canisters from the magazine and cached them. These were traced and placed in a licensed magazine.

Five boys, playing near a clay pit, obtained powder from a canister which had been cached by a workman, instead of having been returned to the magazine. About four or five pounds of powder were found to have been taken. One boy, carrying this supply in a bag, poured a little on a piece of cardboard. He ignited the powder on the cardboard and then proceeded to throw handfuls of powder on to the flame. The powder in the bag ignited. The boy died of his injuries and his four companions sustained severe burns.

Two boys found four canisters of powder near a disused mine and divided the spoil. One gave one canister to another boy, who with two companions started to make firecrackers and to set them off. The powder in the canister ignited and the three boys were badly burned. The boy who had given the powder destroyed his remaining canister on hearing of the accident. The other two were recovered by the Royal Canadian Mounted Police and destroyed.

The other accidents caused by playing with explosives comprised two with dynamite, nine arising from breaking down or otherwise playing with cartridges for small arms, nine with fireworks, and six with railway torpedoes.

In the case of several of the accidents detailed in Appendix D the information available has permitted only of noting that the accident arose from playing with a detonator, or other explosive, and that certain injuries were inflicted. Press notices frequently furnish more, and interesting, particulars. In many cases where the nature of the action which caused the explosion is indicated, the information has been obtained on the initiative of members of the scattered detachments of the Royal Canadian Mounted Police. The interest taken by these, individually, in the promotion of the sane handling of explosives has been invaluable. It is not, by any means, confined to accidents, but when an accident is heard of the usual practice has been to report it, together with the result of investigation immediately made. Such enquiries oftentimes bring in their train other matters touching on the enforcement of the regulations, also given prompt attention, and when there may be reason to fear that there may still be stray explosives in the locality, not only is a search made but children are cautioned through teachers and parents. It is a humanitarian, as well as a law enforcement service, appreciated by those who are in touch with it, although noted only in these very brief records.

APPENDIX A

Factories Licensed to Manufacture Explosives in 1928

Owner	Location of factory	General nature of product	Remarks
Canadian Explosives, Ltd.....	Belœil, P.Q.....	Blasting explosives, black powders, propellants.	
Canadian Explosives, Ltd.....	James Island, B.C..	Blasting explosives, black powders.	
Canadian Explosives, Ltd.....	Nobel, Ont.....	Blasting explosives.	
North Star Explosives Co., Ltd.	Prescott, Ont.....	Fulminate of mercury...	Operation intermittent.
Mexco Co.....	Parry Sound, Ont...	Blasting explosives.	
Dominion Cartridge Co., Ltd..	Brownsburg, P.Q....	Ammunition, detonators, etc.	
Canadian Safety Fuse Co.....	Brownsburg, P.Q....	Safety fuse.	
T. W. Hand Fireworks Co., Ltd.	Hamilton, Ont.....	Fireworks.	
Toronto Fireworks Co.....	Toronto, Ont.....	Fireworks.	
Dominion Fireworks Manufacturing Co.	Dixie, Ont.....	Fireworks.	
Dominico Ruffo.....	Cornwall, Ont.....	Fireworks.....	Operation intermittent.
B. Marroni.....	St. Pierre, P.Q....	Fireworks.....	Operation intermittent.

APPENDIX B

Production of Explosives in Canadian Factories during the Year 1928

	Quantity
Class I. Gunpowder.....	379,137 lb.
" II. Nitrate mixtures.....	1,608,150 "
" III. Nitro-compounds—	
Division 1.....	43,909,891 "
" V. Fulminates—	
Division 1.....	58,437 "
" VI. *Ammunition—	
Division 1—	
Safety cartridges.....	108,717,516
Safety fuse.....	Output of one factory.
Railway torpedoes.....	Output of one factory.
Percussion caps.....	1,200,000
Division 3—	
Detonators and electric detonators.....	Output of one factory.
" VII. Fireworks—	
Division 2.....	(approx.) \$ 230,000

*Exclusive of artillery ammunition.

APPENDIX C

Explosives imported into Canada January 1 to December 31, 1928

Class	Division	Description	Quantity
II	Nitrate mixtures.....	43,013 lb.
III	1	Mixtures containing liquid nitro-compounds.....	10,289 "
	2	Nitro-compounds:—	
		(a) Propellants.....	193,064 "
		(b) For use in explosives factories.....	75,286 "
		(c) For other manufacturing purposes.....	1,036,577 "
V	1	Fulminates.....	30,000 "
VI	1	Percussion caps.....	21,000
		Safety fuse.....	19,000 ft.
	2	Miner's squibs.....	700
		Detonating fuse.....	509,758 ft.
	3	Detonators and electric detonators.....	6,190
VII	2	Manufactured fireworks.....	(approx.) 460,000 lb.

APPENDIX D—Continued

Playing with Detonators

Cause of Accident	Killed	Injured
Man, age 76, an old prospector, examined a detonator in his home. It exploded. He died of injuries.....	1	
Boys, ages 12 and 14, found detonators on Coal Company's property. They exploded one by striking it with a stone. Both were injured about the face, legs and body.....		2
Boys, ages 7 and 10, found detonator near excavation work. One boy held detonator while the other applied a light. Both received injuries to face and body by the explosion.....		2
Boy stole box of detonators from a warehouse and distributed them among children. Girl, age 14, placed one on stove, it exploded. She lost two fingers and thumb.....		1
Boy lost finger and thumb by explosion of a detonator ignited by a match....		1
Boy playing with detonator, accidentally exploded it, and lost two fingers and thumb and had one eye seriously injured.....		1
Boy, age 17, found box of detonators in his home. He attempted to pick the composition of one with a pin. He lost first finger and thumb of left hand.....		1
Four children found a box of detonators on their father's farm. The detonators were exploded in play. Two children were killed and two severely injured.....	2	2
Two boys, ages 10, found a detonator on railway tracks. They exploded it by applying a match. Each boy lost two fingers of left hand.....		2
Boy, age 11, accidentally exploded a detonator with which he was playing. His hands, chest, and left eye were injured.....		1
Boy and girl (Japanese), ages 4 and 8 respectively, found a detonator in their house and exploded it in play. Boy's face and hands severely cut. Girl lost left eye.....		2
Boy, age 12, lost three fingers and an eye by the explosion of a detonator with which he was playing.....		1
Boy lost three fingers and received injuries to face, body, and legs while playing with a detonator which exploded.....		1
Two boys found a box of detonators and succeeded in removing the composition from several and collected it in a small glass bottle. Igniting small piles of the powder a spark communicated to the container, causing explosion. Each boy lost an eye, one also lost a hand.....		2
Boy, age 13, found a box of detonators on farm, where he was working. He applied a match to one. He lost thumb and middle finger of left hand by the explosion.....		1
Boy, age 13, accidentally exploded a detonator with which he was playing, and lost three fingers and thumb.....		1
Boy Scouts, ages 13 and 14, on "Treasure Hunt" found a box of detonators on beam of disused shack. Trying to open one with a knife it exploded. Both boys received minor injuries. The detonators were probably damp.....		2
Girl, age 12, found a detonator near her home. It exploded while she was playing, causing her hands to be severely injured.....		1
Boy, age 12, found box containing detonators, fuse, tools, and matches. He applied a match to a detonator and lost an eye and two fingers of left hand.....		1
Boys found a detonator in quarry. Failing to explode it by striking with a stone they applied a match. One boy lost his right eye and right thumb. Four other boys received minor injuries.....		5
Boy found a box of detonators and applied a match to one. He lost the ends of three fingers of left hand. His right hand and knees were severely injured.....		1
Boy, age 16, took a detonator from construction party's store, and endeavoured to extract the composition with a pin. He lost three fingers and the thumb of his left hand, and the first finger of his right.....		1
Child, age 2½, found a box of detonators in tool shed of farm. While carrying them he fell. He was killed by the explosion.....	1	

APPENDIX D—*Continued*

Playing with Detonators

Cause of Accident	Killed	Injured
Boy, age 12, found a detonator, where contractors were working. He exploded it by applying a match. Two fingers and thumb were very badly lacerated.....		1
Boy found detonators in gravel pit. He struck one with a hammer and lost a thumb and an eye by the explosion.....		1
Boy, age 10, found a detonator on the street. He cut it to make a whistle and so exploded it. He lost three fingers.....		1
Boy, age 14, took an electric detonator from a well driller's supplies, which had been left in his father's barn. He applied the leading wires to terminals of a battery and was severely injured.....		1
Boy, age 15, exploded a detonator while playing with it. He received severe injuries to one eye.....		1
Boy, age 5, obtained a detonator on farm and thrust slate pencil into it. Hand was shattered by explosion.....		1
Boy, age 14, applied match to detonator and lost two fingers and thumb by the explosion.....		1
	4	39

APPENDIX D—ContinuedPlaying with Explosives

Cause of Accident	Killed	Injured
<i>Powder— (See also text).</i>		
Igniting powder, poured from canister, the whole caught fire.....		3
Setting fire to powder, poured from canister, in abandoned magazine....	1	2
Igniting powder poured from bag, the whole caught fire.....	1	4
Making fireworks with powder from canister, the whole caught fire....		3
<i>Dynamite—</i>		
Indian boy found stick of dynamite in a boathouse. While playing with it explosion occurred. He lost both hands and received injuries to head.....		1
Youth found primed stick of dynamite and threw it on a rock. It exploded. His eyes were injured. The small debris also caused several minor wounds to his face.....		1
<i>Railway Torpedoes—</i>		
Boy found a torpedo near railway tracks. He applied a light and lost two fingers and part of thumb of left hand by the explosion.....		1
Boy, age 6, found a torpedo on the street. He tried to open it with a chisel. Explosion caused laceration of face, body, arms, and hands. Three children found a torpedo near their home and struck it with a hammer. All three were taken to hospital suffering from injuries..		1
Boy found torpedo and struck it with a hammer. His hands were injured.....		3
Boy, age 7, playing with a torpedo caused it to explode. He received injuries to head, face, eyes and body.....		1
Boy, age 12, found a torpedo and exploded it. Both eyes were injured..		1
<i>Small Arms Ammunition—</i>		
Boy, age 13, removed charge from a .22 R.F. cartridge and ignited it. He lost thumb and tips of two fingers of right hand by the explosion..		1
Boy exploded .22 R.F. cartridges, by throwing them against a wall. Companion, approaching, lost sight of an eye by the projected material.....		1
Boy, age 13, had eye severely injured, by the explosion of a .22 R.F. cartridge in the hands of a companion who tried to force it into an air rifle.....		1
Man had face lacerated and eye injured by the explosion of a S.A. cartridge placed in his pipe, as a practical joke.....		1
Boy, age 11, laid .22 R.F. cartridges on railway track and exploded them by striking with a stone. A large piece lodged in bridge of his nose..		1
Boy, age 11, removed powder charge from a shotshell and applied a light. The explosion caused severe burns to his face.....		1
Youth, age 20, tapped a .22 R.F. cartridge with pair of pliers. The explosion caused the bullet to enter his right eye.....		1
Boy, age 16, picking at primer of shotshell with knife exploded it. He lost several fingers of left hand and destroyed left eye.....		1
Boy threw a S.A. cartridge on to burning grass. It exploded and the bullet entered his brother's abdomen.....		1
<i>Firecrackers—</i>		
Boy was severely burned when companion dropped a lighted firecracker down the collar of his coat.....		1
Boy picked up a "thunderbolt" which he thought had misfired. It exploded in his face. His face and eyes were injured.....		1
Boy thought a "pinwheel" had misfired and placed in in his pocket. It went off and burned him severely.....		1
Children playing with firecrackers received burns to arms, face and eyes		3
Boy, age 6, playing at a garage got his clothes smeared with an inflammable grease. He started firing off firecrackers. His clothing ignited. He died from injuries.....	1	
Boy, age 13, fired a two inch salute cracker while holding it in his hand. His right eye was injured.....		1
Girl, age 8, was burned about the legs when a lighted firecracker was thrown into a motor car in which she was a passenger.....		1
Girl, age 6, dropped a lighted firecracker down the bib of her overall. She received severe burns.....		1
Boy was severely burned by the explosion of firecrackers which while in his pocket were ignited by a companion.....		1
	3	41

APPENDIX D—*Concluded*

Various

Cause of Accident	Killed	Injured
Man working in a construction camp near a fire, received injuries to leg by explosion of a detonator.....		1
Man was thrown from his horse which had been frightened by the explosion of a firecracker.....		1
Man shovelling coal from company's stock pile, hit a detonator which exploded. First finger and part of left hand were blown off.....		1
Woman watching firework display was struck by a rocket. Her arm was injured.....		1
Girl burned some rubbish containing powder. She was slightly injured by the explosion.....		1
Man watching firework display from a window was hit by a rocket. Sight of one eye was severely and permanently impaired.....		1
Explosion of a firecracker caused an outbreak of fire, at a farmhouse. One child was injured.....		1
Man while moving garbage struck a detonator in it with his shovel. He lost an eye.....		1
		8

APPENDIX E

Authorized Explosives

Explosives manufactured by Canadian firms as hereunder detailed:—

*Burrowite Explosives, Ltd.

Burrowites Nos. 1, 2, and 3.

Canadian Explosives, Ltd.

Polar dynamite—25, 30, 35, 40, 50, and 60 per cent.

Polar dynamite, mining—35, 40, and 50 per cent.

Polar ammonia dynamite—20, 25, 30, 35, 40, 50, 60 per cent and "H".

Polar ammonia dynamite, mining—20, 25, 30, 35, 40, 45, 50, 55, and 60 per cent.

Polar gelatinized dynamite—50, 60, 65, 70, and 75 per cent.

Polar forcite gelatin—30, 35, 40, 50, 60, 75, and 80 per cent.

Polar forcite gelatin—Diamond—30, 35, 40, 50, 60, 75, and 80 per cent.

Polar gelatin dynamite—30, 35, 40, 50, 60, 75, and 80 per cent.

Special dynamites—No. 1—No. 2.

Coal mining explosives.

Polar Monobel Nos. 1, 3, 4, 6, and 12.

Miners' Friend No. 9.

Coalite G.

Polar CXL-ite No. 2.

Polar stumping powders No. 1 and extra.

S.N.G.

Export gelignites—42, 50, 51, 58, and 62 per cent.

Samsonite—50 and 60 per cent.

Safety fuse lighters.

Signal bombs.

Cordite.

Black blasting powders.

Black powder pellets.

Gunpowder.

Sporting powders.

Safety fuse powder.

Canadian Safety Fuse Co., Ltd.

Safety fuse—"Clover" brand.

Safety fuse—"Beaver" brand.

Safety fuse—"White Jacket" brand.

Safety fuse—"Crown" brand.

Safety fuse—"Moose" brand.

Dominion Cartridge Co., Ltd.

Ammunition.

Detonators.

Percussion caps.

Railway torpedoes.

Electric detonators.

Railway fusees.

Mexco Ltd.

Klorex, Nos. 1 and 2.

North Star Explosives Co., Ltd.

Fulminate of mercury.

APPENDIX E—*Continued*

Authorized Explosives

All explosives on the British authorized list are provisionally authorized in Canada, and in addition, those manufactured by the following firms, as detailed below:—

Aetna Explosives Co., Inc.

Standard dynamite L.F.—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.
 Straight dynamite—15, 20, 25, 27, 30, 33, 35, 40, 45, 50, and 60 per cent.
 Keystone standard gelatin—40, 60, and 75 per cent.
 Stumping powders—20 and 30 per cent.

American Glycerine Co.

Nitroglycerine.

Atlas Powder Co.

Electric blasting caps, Nos. 6, 7, and 8.
 Blasting caps, Nos. 6, 7, and 8.
 Nitrocellulose.
 Trinitrotoluene.

California Cap Co.

Detonators.

Dunmore National Chemical Co.

Regina Stumping powder Nos. 1 and 2.
 Regina Rock powder Nos. 1 and 2.

E. I. Dupont de Nemours & Company, Inc.

Dupont bulk rifle powders (Nos. 80, 90, 91, 92) Rifle No. 1 Schuetzen.
 Dupont smokeless shotgun powder.
 Dupont pistol powders Nos. 3 and 5.
 Dupont sporting rifle powders Nos. 95, 96, and 93.
 Dupont military rifle powders (M.R. No. 20-23) (Nos. 10, 21, 22, 30, 40, and 50).
 Dupont gallery rifle powder No. 75.
 Dupont Schultze smokeless shotgun powder.
 Ballistite smokeless shotgun powder.
 Improved military rifle powders Nos. 13, 15, 15½, 16, 17, 17½, 18, 23, 25, and 25½.
 Dupont dense smokeless shotgun powder.
 Fulminate of mercury.
 Guncotton.
 Trinitrotoluene.
 Dynamite and blasting gelatin.

Ensign-Bickford Co.

Cordeau-Bickford fuse.

Hercules Powder Co.

Bullseye revolver powder.
 Infallible smokeless shotgun powder.
 Dynamite and blasting gelatin.

Independent Torpedo Co.

Nitroglycerine.

Puget Sound and Alaska Powder Co.

Gelatin dynamite—25, 30, 35, 40, and 60 per cent.
 Dynamite, L.F.—20, 30, 40, and 60 per cent.

United Railway Signal Corporation.

Railway torpedoes.

Western Cartridge Co.

Detonators.

APPENDIX E—*Concluded***Authorized Explosives**

Brucker & Zinke.

Safety fuse—"Globe" brand.

Fireworks as manufactured by the following Canadian makers, namely:—

T. W. Hand Co. Ltd.

D. Ruffo.

Toronto Fireworks Co., Ltd.

Dominion Fireworks Manufacturing Co.

Berardo Marroni.

Macdonald Metals Product Company.

Certain fireworks manufactured by the following foreign makers, namely:

Rochester Fireworks Company.

M. Backes Sons, Inc.

Hitt Fireworks Co. Inc.

A. Jedel.

Kilgore Manufacturing Co.

National Fireworks Inc.

Victory Sparkler Co.

Essex Specialty Co.

Edwards Co.

Federal Buster Corporation.

Los Angeles Fireworks Co.

Geb. Weinrich.

Central Railway Signal Co.

Fred. Wicke.

Ying Shing Loong.

M. Wagner.

J. F. Eisfeld.

International Fireworks Co.

Edmiston Manufacturing Co.

Adrian and Rohde.

Hamburg-Bremer Handelgesellschaft.

A. G. für Anilinfabrikation.

Wilhelm Fischer.

Potts Fireworks Display Co.

Antonelli Fireworks Co.

Safety Automatic Toy Co.

American Fireworks Co.

Blumberg & Co.

Standard Railway Fusee Corp.

Unexcelled Manufacturing Co. Inc.

Also Chinese firecrackers with gunpowder composition and not exceeding 4 inches in length and nine-sixteenth inch in diameter and such other varieties the authorization of which has been specially notified to the parties immediately concerned.

